CONTENTS

No. 1, February 1989

DEVELOPMENT AND REPRODUCTION

Brazeau, Daniel A., and Howard R. Lasker
The reproductive cycle and spawning in a Caribbean gorgonian 1

Kadam, Arjun L., and S. S. Koide
Characterization of a factor with oocyte maturation inducing activity in *Spisula* 8

Pechenik, Jan A., and Linda S. Eyster
Influence of delayed metamorphosis on the growth and metabolism of young *Crepidula fornicata* (Gastropoda) juveniles 14

Strathmann, Richard R.
Existence and functions of a gel filled primary body cavity in development of echinoderms and hemichordates 25

ECOLOGY AND EVOLUTION

Tepper, Bruce, and Brian P. Bradley
Temporal changes in a natural population of copepods 32

GENERAL BIOLOGY

Hunter, Tom
Suspension feeding in oscillating flow: the effect of colony morphology and flow regime on plankton capture by the hydroid *Obelia longissima* 41

Wolcott, Thomas G., and Anson H. Hines
Ultrasonic biotelemetry of muscle activity from free-ranging marine animals: a new method for studying foraging by blue crabs (*Callinectes sapidus*) 50

SHORT REPORT

Aoki, Masakazu, Koichiro Hashimoto, and Hiroshi Watanabe
The intrinsic origin of bioluminescence in the ascidian, *Clavelina miniata* 57

ABSTRACTS

Abstracts of papers presented at the Marine Biological Laboratory: Northeastern Regional Conference on Developmental Biology 63

No. 2, April 1989

BEHAVIOR

Elliott, J. K., D. M. Ross, C. Pathirana, S. Miao, R. J. Andersen, P. Singer, W. C. M. C. Kokke, and W. A. Ayer
Induction of swimming in *Stomphia* (Anthozoa: Actiniaria) by imbricatine, a metabolite of the asteroid *Dermasterias imbricata* 73

DEVELOPMENT AND REPRODUCTION

Byrne, Maria
Ultrastructure of the ovary and oogenesis in the ovoviviparous ophiuroid *Ophiolepis paucispina* (Echinodermata) 79

Fujisawa, Hirosuke
Differences in temperature dependence of early development of sea urchins with different growing seasons 96

Gibson, Glenys D., and Fu-Shiang Chia
Developmental variability (pelagic and benthic) in *Haminoea callidegentia* (Opisthobranchia: Cephalaspidea) is influenced by egg mass jelly 103

Holland, Nicholas D., and Linda Z. Holland
Fine structural study of the cortical reaction and formation of the egg coats in a lancelet (=amphioxus), *Branchiostoma floridae* (phylum Chordata: subphylum Cephalochordata=Acrania) 111

Rice, Stanley A., and Kevin J. Eckelbarger
An ultrastructural investigation of spermatogenesis in the holopelagic polychaetes *Vanadis formosa* and *Krohnia lepidota* (Polychaeta: Alciopidae) 123

ECOLOGY AND EVOLUTION

Klerks, P. L., and J. S. Levinton
Rapid evolution of metal resistance in a benthic oligochaete inhabiting a metal-polluted site 135

Marcus, Nancy H.
Abundance in bottom sediments and hatching requirements of eggs of *Centropages hamatus* (Copepoda: Calanoida) from the Alligator Harbor region, Florida 142
Schwartz, Steven S., and Paul D. N. Hebert
The effect of *Hydra* on the outcome of competition between *Daphnia* and *Simocephalus* 147

PHYSIOLOGY

Arkett, Stuart A., Fu-Shiang Chia, Jeff I. Goldberg, and Ron Koss
Identified settlement receptor cells in a nudibranch veliger respond to specific cue 155
Manahan, Donal T., William B. Jaeckle, and Saeid D. Nourizadeh
Ontogenic changes in the rates of amino acid transport from seawater by marine invertebrate larvae (Echinodermata, Echiura, Mollusca) 161
Mladenov, Philip V., Suleiman Igdoura, Satish Asotra, and Robert D. Burke
Purification and partial characterization of an autotomy-promoting factor from the sea star *Pycnopodia helianthoides* 169
Ogilvy, Christopher S., Stephen H. Fox, and Arthur B. DuBois
Mechanisms of cardiovascular compensation for gravity in bluefish (*Pomatomus saltatrix*) 176

SHORT REPORT

Thuesen, Erik V., and Kazuhiro Kogure
Bacterial production of tetrodotoxin in four species of Chaetognatha 191

NO. 2, APRIL SUPPLEMENT 1989

Preface 3

CALCIUM CONCENTRATION GRADIENTS IN DEVELOPMENT

Kropf, Darryl L.
Calcium and early development in fucoid algae ... 5
Speksnijder, J. E., M. H. Weisenseel, T.-H. Chen, and L. F. Jaffe
Calcium buffer injections arrest fucoid egg development by suppressing calcium gradients 9
Brownlee, Colin
Visualizing cytoplasmic calcium in polarizing zygotes and growing rhizoids of *Fucus serratus* 14
Steer, Martin W.
Calcium control of pollen tube tip growth 18
Miyazaki, Shun-Ichi
Calcium wave in activating hamster eggs 21
Cork, R. J., A. F. Strautman, and K. R. Robinson
Measuring cytoplasmic calcium: a review of three methods with emphasis on the practical aspects of their use 25

ION CURRENTS AND CELL POLARITY IN PLANT SYSTEMS

Gow, Neil A. R.
Relationship between growth and the electrical current of fungal hyphae 31
Troxell, Cynthia L.
Transcellular ionic currents during primary cell wall morphogenesis in *Micrasterias* and *Closterium* .. 36
Nawata, Tomoki, Tasuku Hishinuma, and Shunji Wada
Ionic currents during regeneration of thallus and rhizoid from cell segments isolated from the marine alga *Bryopsis* 41
Rathore, Keerti S., and Kenneth R. Robinson
Ionic currents around developing embryos of higher plants in culture 46
Björkman, Thomas
The use of bioelectric currents to study gravity perception in roots 49
Hush, Julia M., and Robyn L. Overall
Steady ionic currents around pea (*Pisum sativum* L.) root tips: the effects of tissue wounding 56
Miller, Andrew L.
Ion currents and growth regulators in plant root development 65

ION CURRENTS AND CELL POLARITY IN INSECTS

Woodruff, Richard I.
Charge-dependent molecular movement through intercellular bridges in *Drosophila* follicles 71
Sun, Yi-An, and Robert J. Wyman
The *Drosophila* egg chamber: external ionic currents and the hypothesis of electrophoretic transport 79
Diehl-Jones, W., and E. Huebner
Pattern and composition of ionic currents around ovarioles of the hemipteran, *Rhodnius prolixus* (Stahl) 86
Verachtert, Barend, and Arnold De Loof
Intra- and extracellular electrical fields of vitellogenic polytrophic insect follicles 91
Kunkel, J. G., and E. Bowdan
Modeling currents about vitellogenic oocytes of the cockroach, *Blattella germanica* 96

ION CURRENTS AND CELL POLARITY IN OTHER ANIMAL SYSTEMS

Zivkovic, D., and M. R. Dohmen
Ionic currents in *Lymnaea stagnalis* eggs during maturation divisions and first mitotic cell cycle 103
Winkel, Glen K., and Richard Nuccitelli
Large ionic currents leave the primitive streak of the 7.5-day mouse embryo 110
Kŭcera, Pavel, and Yves de Ribaupierre
Extracellular electrical currents in the chick blastoderm 118
Oiki, Shigetoshi, Takako Ohno-Shosaku, and Yasunobu Okada
Electric currents associated with directed migration of fibroblasts 123
Peng, H. Benjamin, and Ding-Liang Zhu
Ionic control of postsynaptic differentiation in muscle 126

GALVANOTROPISM AND GALVANOTAXIS IN DEVELOPMENT AND REGENERATION

Nuccitelli, Richard, and Tanya Smart
Extracellular calcium levels strongly influence neural crest cell galvanotaxis 130
McCaig, Colin D.
On the mechanism of nerve galvanotropism 136
McCaig, Colin D., and Philippa J. Dover
On the mechanism of oriented myoblast differentiation in an applied electric field 140
White, Rosemary G., and Robyn L. Overall
Elongation of initially non-polar protoplasts is oriented by electric fields 145
Cooper, Mark S., John P. Miller, and Scott E. Fraser
Electrophoresis of cytoplasmic molecules through gap junctions by externally applied electric fields .. 150
Stollberg, Jes, and Scott E. Fraser
Electric field-induced redistribution of ACh receptors on cultured muscle cells: electromigration, diffusion, and aggregation 157
Ryan, Timothy, Jeffrey Myers, and Watt W. Webb
Molecular interactions on the cell surface revealed by electrophoresis 164
Parkinson, W. C., and C. T. Hanks
Experiments on the interaction of electromagnetic fields with mammalian systems 170
Chiang, Meicheng, E. J. Cragoe Jr., and Joseph W. Vanable Jr.
Electrical fields in the vicinity of small wounds in *Notophthalmus viridescens* skin 179
Index 184

No. 3, June 1989

Editor's note iv

INVITED REVIEW

Wiercinski, Floyd J.
Calcium, an overview—1989 195

BEHAVIOR

Elliott, Joel, and Clayton B. Cook
Diel variation in prey capture behavior by the corrallimorpharian *Discosoma sanctithomae*: mechanical and chemical activation of feeding 218
Forward, Richard B., Jr.
Behavioral responses of crustacean larvae to rates of salinity change 229
Karnofsky, Elisa B., Jelle Atema, and Randall H. Elgin
Field observations of social behavior, shelter use, and foraging in the lobster, *Homarus americanus* ... 239
Karnofsky, Elisa B., Jelle Atema, and Randall H. Elgin
Natural dynamics of population structure and habitat use of the lobster, *Homarus americanus*, in a shallow cove 247

DEVELOPMENT AND REPRODUCTION

Eckelbarger, Kevin J., Craig M. Young, and J. Lane Cameron
Ultrastructure and development of dimorphic sperm in the abyssal echinoid *Phrissocystis multispina* (Echinodermata: Echinoidea): implications for deep sea reproductive biology 257

ECOLOGY AND EVOLUTION

Brewer, Robert H.
The annual pattern of feeding, growth, and sexual reproduction in *Cyanea* (Cnidaria: Scyphozoa) in the Niantic River Estuary, Connecticut 272
Kingsley, Elizabeth A., David A. Briscoe, and David A. Raftos
Correlation of histocompatibility reactions with fusion between conspecifics in the solitary urochordate *Styela plicata* 282

GENERAL BIOLOGY

Suhr-Jessen, Peter, Leif Baek, and Per Ploug Jakobsen
Microscopical, biochemical, and immunological studies of the immune defense system of the horseshoe crab, *Limulus polyphemus* 290

PATHOLOGY

Leibovitz, Louis, and Sasha Koulish
A viral disease of the ivory barnacle, *Balanus eburneus*, Gould (Crustacea, Cirripedia) 301

PHYSIOLOGY

Cronin, Thomas W., and Christina A. King
Spectral sensitivity of vision in the mantis shrimp, *Gonodactylus oerstedii*, determined using noninvasive optical techniques 308

Jaeckle, William B., and Donal T. Manahan
Amino acid and metabolism by larvae of the marine worm *Urechis caupo* (Echiura), a new species in axenic culture 317

Jennings, Joseph B.
Epidermal uptake of nutrients in an unusual turbellarian parasitic in the starfish *Coscinasterias calamaria* in Tasmanian waters 327

WORKSHOP REPORT

Marine models in biomedical research
A report from the Marine Life Resources Workshop 337

Index to Volume 176 349